EXTENSION

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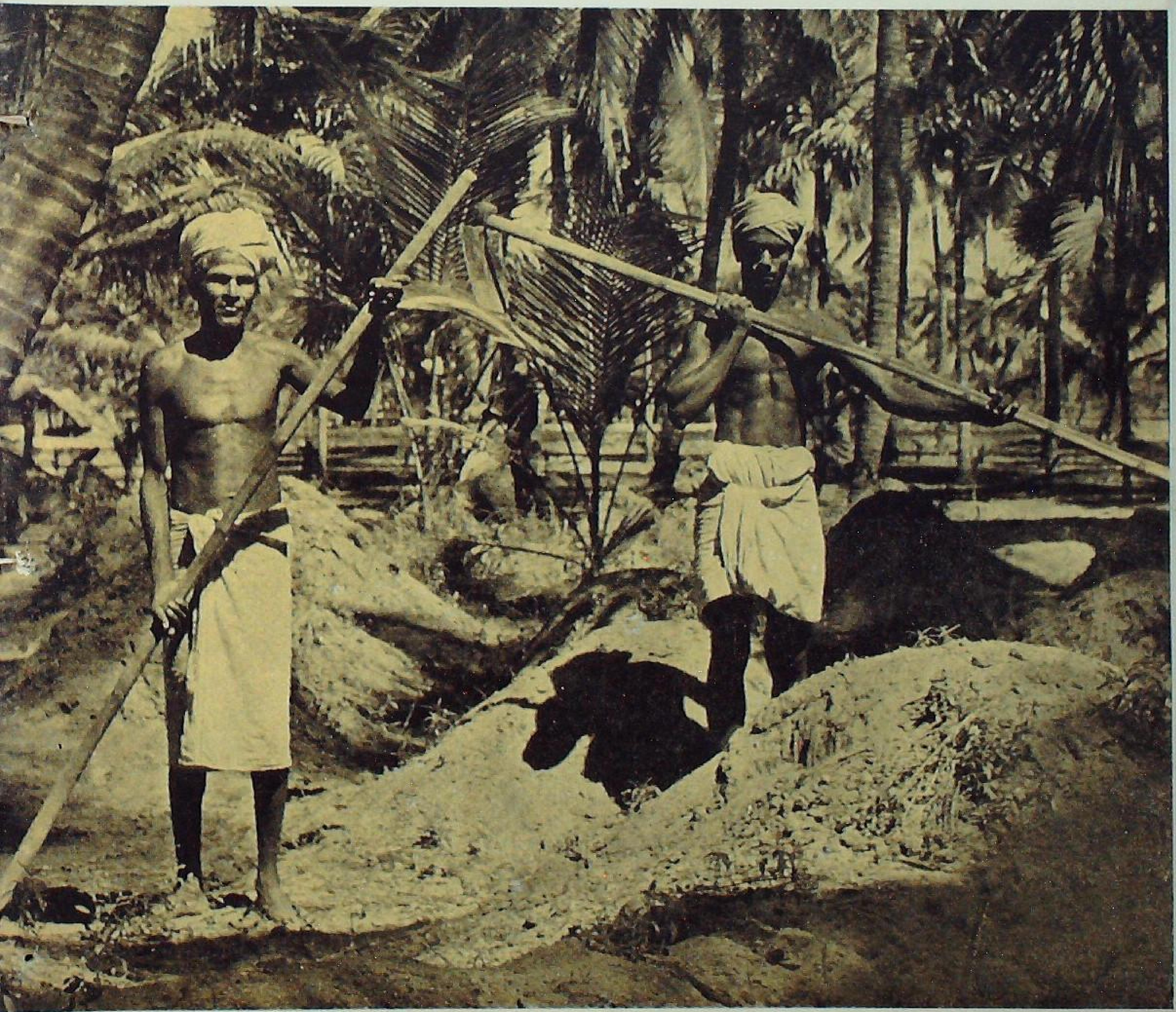

THE FARM AND FARM HOME MAGAZINE July, 1961

OUR COVER PICTURE

The coconut palm needs the soil to give it the moisture it needs to grow and produce well. One way of getting the soil suck in moisture and keep it longer is to keep it into mounds before the rains set in, and level these up after the rains have stopped.

EXTENSION

THE FARM AND FARM HOME MAGAZINE

July, 1961 Vol. 2 No. 1

SPECIAL COCONUT NUMBER

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FARM INFORMATION UNIT
DIRECTORATE OF EXTENSION, MINISTRY OF FOOD AND AGRICULTURE, GOVT. OF INDIA, NEW DELHI

Principal Editor	M.G. Kamath
Editor	T.C. Roy
Associates	Lal Karamchandani
	Sham Govind Ranade
	Shukla Das
Art Editor	Pratap Deb
Business Manager	R.D. Khanna

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MORE COCONUTS
PER PALM

YES, THERE ARE WAYS OF MAKING YOUR PALMS GIVE YOU MORE NUTS, MORE RETURNS, THAN WHAT YOU GET TODAY

THERE is a shortage of coconuts today in India, because our palms are not producing the number of coconuts they should.

It is easy to coax your coconut garden to give you more coconuts per palm.

There are the improved practices—manuring, cultivation, and pest and disease control. Each of these practices, if you follow, can raise the annual yield higher. If you follow all, yours would be a garden that will pay off very well.

The kind of practice you have to take up depends largely upon the type of soil you have and also, the rainfall, its distribution and the availability of underground water.

See which one of these practices is most suited to your garden.

LOAMY SOIL

This is a fairly well-drained soil, but poor in fertility. In this soil, the palms respond quickly to manuring and cultivation.

Use any of these mixtures for manuring your palms. The dose is per tree per year.

	in pounds
Ammonium sulphate	3 to 4
Superphosphate or bonemeal	2
Muriate of potash	2 to 3
or	
Groundnut cake	15 to 20
Ash	2
Superphosphate or bonemeal	2

If your garden has only coconut palms, and these are not spaced wide, broadcast the mixture and plough it in. The better way is to dig a shallow basin round the base of each tree and apply the manure.

In both cases, see that the soil is sufficiently moist when you apply the manure. If the rainfall in your area is not quite good, apply the mixture in two doses; otherwise, only in one dose.

Loamy soils lack in organic matter. Hence, grow a green manure crop or bring in and apply 50 to 100 pounds of leaves per tree.

Select a legume like sunnhemp, cowpea, *Crotalaria striata* and *Calopogonium mucunoides* for sowing in your garden if you are on the West Coast.

Sow *Crotalaria* broadcast in April-May, with a seed-rate of 20 to 25 pounds per acre. Cover with a light plough. Dibble cowpea or sunnhemp behind a *desi* plough in June, using a seed-rate of 50 to 60 pounds. If it is *Calopogonium*, broadcast the seed at eight to ten pounds per acre. All these can be ploughed in in August-September.

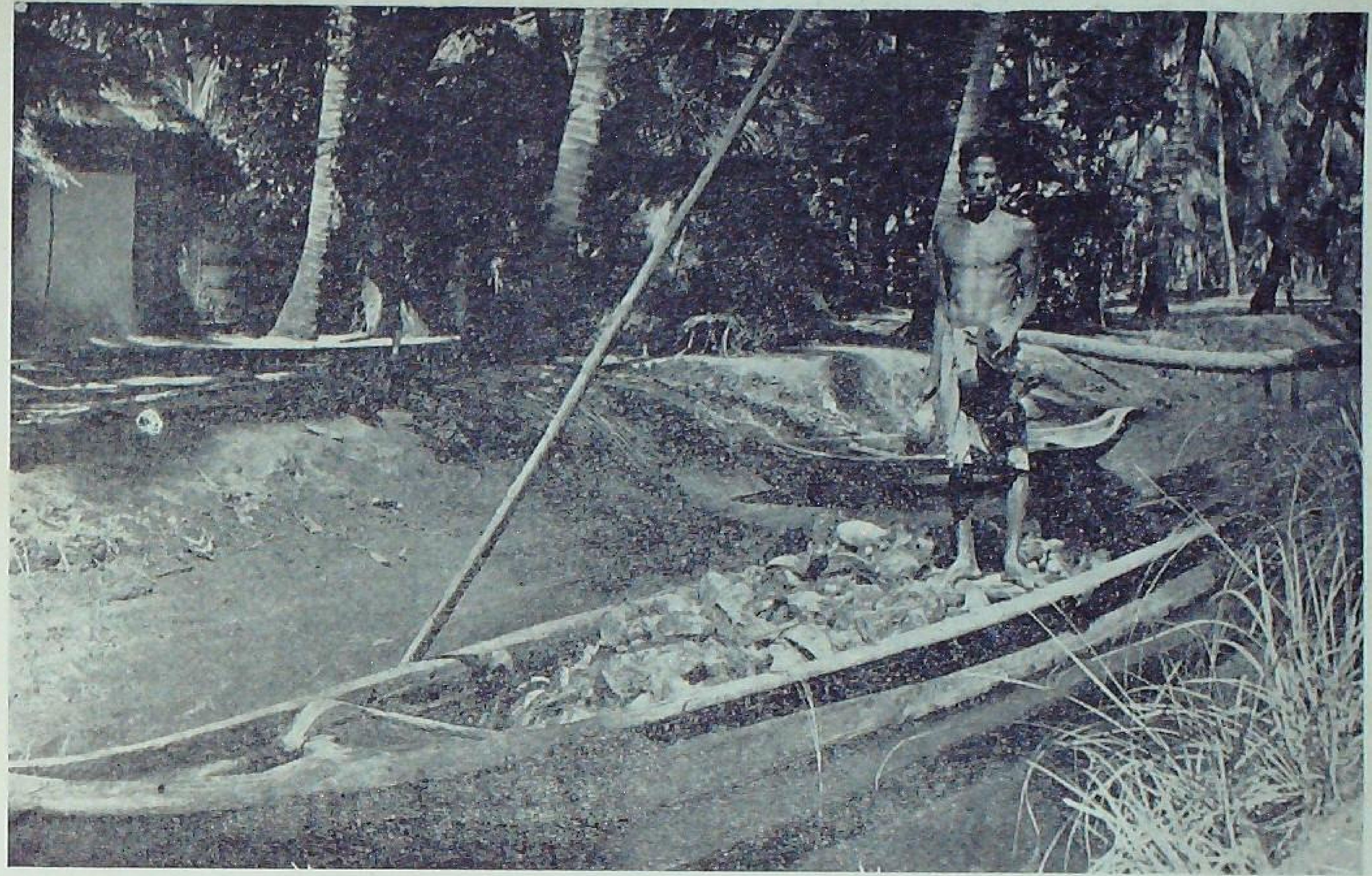
In other areas, sunnhemp is a good crop. You can raise this green manure in June-July or August-September. West Bengal and Assam farmers may like to use green leaves instead of growing a green manure. Cattle manure or compost may be applied (50 pounds per palm) instead.

It is a very good idea to plant *Glyricidia* along the borders of your coconut garden. Plant cuttings in April-May in a nursery, root them, and transplant them in June-July five to six feet apart. You can prune them after two or three years, and apply to the palms in basins dug around them.

When dry coconut husk is available cheap, dig 6 feet wide and 15-inch deep trenches between your coconut rows, and fill them with the husk at 1,000 per tree and cover. The best time to do this is June-July. The trees benefit from this manure for five or six years.

CULTIVATION

Dig the garden with a *mamatty* or plough up once or twice a year. You can also heap up the soil in mounds instead, and level up the same later. If you would rather plough the land, give one ploughing in August-September and another in November-December. If you are raising a green manure crop, you may have to give one more ploughing in April-May.



These husks when buried in-between the palm rows will help conserve moisture

If the rainfall is not sufficient or there are long dry periods, you may water the trees during such periods. But once you take to irrigation, you will have to irrigate the palms every year. If you stop mid-way, yields will go down.

LATERITE AND GRAVELLY LATERITE SOILS

Use this mixture for each tree :

	in pounds
Ammonium sulphate	4 to 5
Bonemeal	3
Muriate of potash	2 to 3

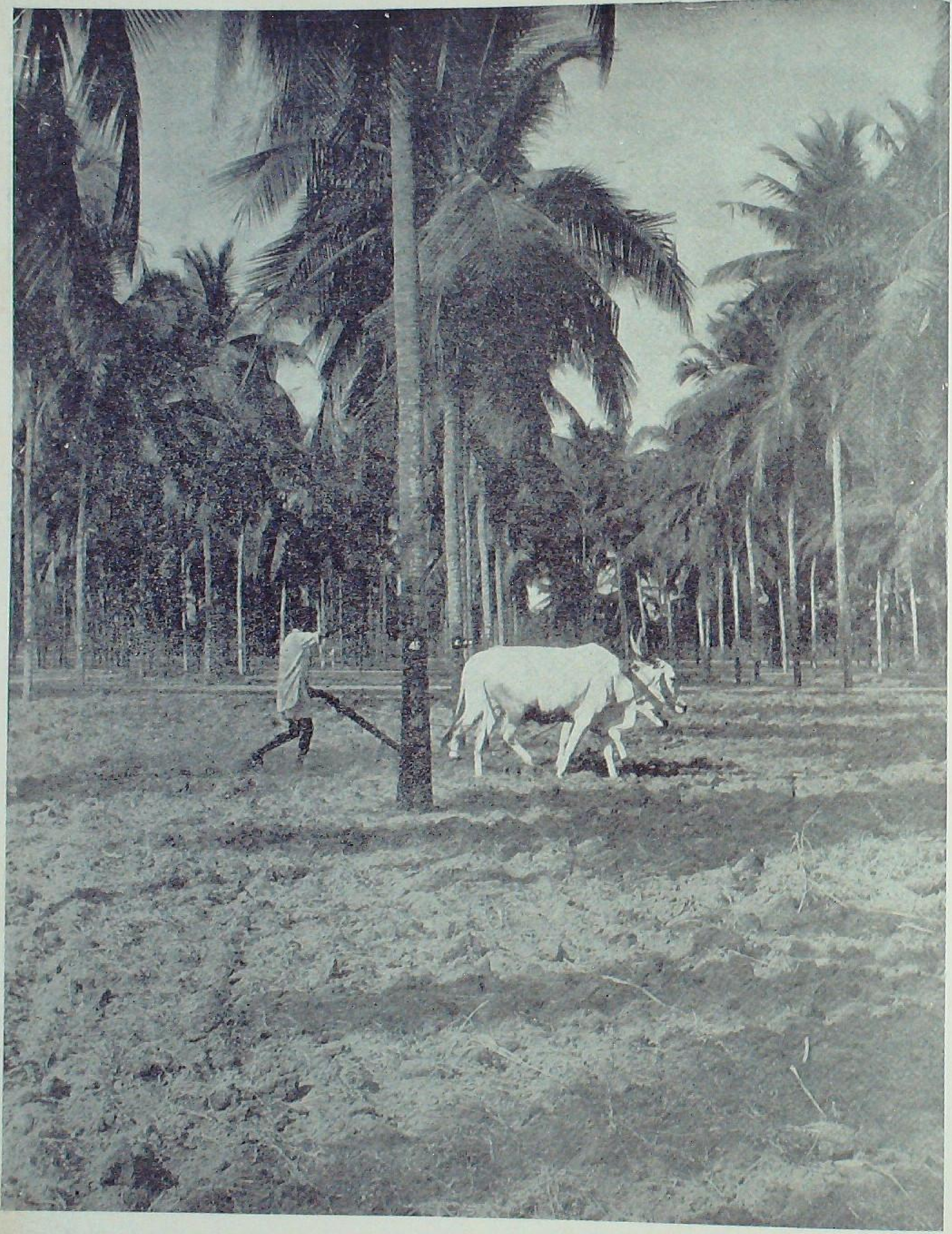
Apply in shallow basins dug round the base of the tree in August-September. See that the soil is moist enough at the time you apply the mixture.

If the surface soil is deep enough, plough. Otherwise, stir the soil round the trees with a fork or pickaxe.

If the land is not even, terrace it. On a slopy land, plough on the contour.

Raise a green manure crop (as detailed) or use green leaves for manuring. Raise *Glyricidia* on the bunds. If compost or cattle manure is available, apply 50 to 100 pounds per tree instead of green leaf.

Common salt helps in improving laterite soils. Apply five to ten pounds per tree.



A cultivated garden produces more nuts per palm than a neglected one

SANDY SOIL

Improvements are possible if you can maintain soil moisture. Where rainfall is sufficient or irrigation is possible or there is a high water-table, take to improved practices.

Use any one of these mixtures :

		in pounds
1.	Cattle manure or compost	100
	Wood ash	20 to 40
2.	Fish guano	15
	Muriate of potash	2 to 3
3.	Prawn dust	15
	Muriate of potash	2 to 3
4.	Groundnut oilcake	15 to 29
	Wood ash	20 to 40
	Superphosphate	2 to 3

For sandy soils, better avoid giving only chemical fertilizers. Apply the manure in basins round the base of trees. If possible, apply in two doses, once in August-September and again in November-December.

In such soils, see that the palms do not form surface roots. Such trees will suffer when there is drought. You can throw the soil in mounds at the end of the south-west monsoon and level them up later. If there is a weed problem, take to cultivation.

Sandy soils need green manure the most. Since soil moisture is a problem, grow *Glyricidia* along the borders. Apply loppings at 50 to 100 pounds per tree. Otherwise, apply green leaves brought from outside.

Wherever possible, improve the soil by adding clay brought from outside. Each tree should get 50 to 100 pounds of clay in the summer (March to May).

To get over the bad effects of drought, spread dry leaves to a radius of six feet round the base of trees. You will need about 25 dry coconut leaves per tree.

Irrigating the trees during dry periods will help increase yield. See if you can easily provide filter points.

ALLUVIAL SOILS

The alluvial soils of the deltaic areas and the reclaimed backwater soils of Kerala are above average in fertility.

Apply per tree :

	in pounds
Ammonium sulphate	2 to 3
Muriate of potash	2 to 3
Superphosphate or bonemeal	2

Apply the mixture in basins after the heavy rains are over.

Dig or plough the lands.

Being rich in organic matter, the soil may not need green manuring. But adding green manures or compost will help open up stiff soils. Sunnhemp and *Pillipesara* come up well in these soils.

Wherever possible, cart in sand to improve the soil. Apply at 100 to 150 pounds per tree during summer.

India annually imports 200 tons of desicated coconut for confectionery and other purposes.

India produces about 415 crores of coconuts a year. Of these, 64 per cent is eaten, leaving the balance for the production of oil. Of this again, 60 per cent is used for dietary purposes, the balance going for the production of soaps and cosmetics.

←Hook out that rhinoceros beetle before it does much damage

FOR BEST RETURNS FROM

KERALA COCONUT GARDENS

APRIL

WHEN possible, irrigate the garden.

MAY

When the rains are received plough up loamy soils and sow a green manure crop. If laterite soil, plough and sow a green manure crop in terraced fields and a cover crop in slopy or uneven land.

JUNE

Plant *Glyricidia* as a hedge round the field and open up basins round the trees in

loamy and laterite and also in sandy soils if green manuring can be done. For alluvial soils, open up basins round the trees.

JULY

Complete digging up basins in loamy and laterite soils. Bury a green manure crop or green leaves in the basins and cover.

In sandy soil, fill basins half with green leaf (where available) and cover with soil.

AUGUST

Top-dress with manure in loamy, laterite and sandy soils.

SEPTEMBER

Continue top-dressing in loamy, laterite, sandy and also in alluvial soils.

In laterite soil apply common salt if you have not applied any other manure. Also plough up or dig the garden in case you don't irrigate your garden.

OCTOBER

In loamy soil, either plough up the garden, or heap soil in mounds. If you have facilities, bury husk between coconut rows.

Continue ploughing or digging soil in laterite soils. In sandy soils, slash growth of cover crop if you had grown one. In alluvial soil, continue top-dressing.

NOVEMBER

In loamy soils, level up the mounds or give a second ploughing. Bury husk if you have the facility.

Give a second digging or ploughing in the laterite soil, which you don't irrigate. Dig or plough the soil and break clods in alluvial soils.

DECEMBER

Irrigate in loamy soils, and also in laterite ones (if you have the facility). Sow summer vegetables in the latter. Cart in clay for sandy soil. In coarse sands, apply a leaf mulch round the base of the tree. In alluvial soils, cart in and apply sand.

JANUARY TO MARCH

Continue irrigation in loamy soils ; continue vegetable cultivation in loamy, and irrigation in sandy soils.

BHC FOR COCKCHAFER GRUBS

In certain areas of Kerala State, cockchafer grubs damage the palms by eating away the roots in the soil. You can control the pest by ploughing in 10 per cent BHC dust at 56 pounds per acre in March-April.

Farmers lose ten million rupees a year in Kerala because of root and leaf diseases of coconut.

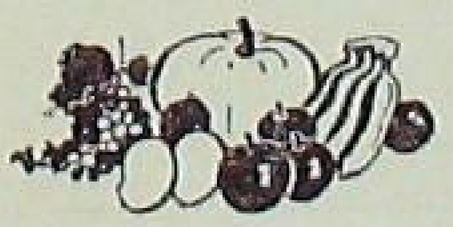
LEAFLETS
FOR PROGRESSIVE FARMERS

FARMING

Treating seed before sowing
Protect your soil
Better implements for a better rice crop
How to treat paddy seed
Better level and bund your field
Raise a better barley crop
Getting good gram yields
The way to higher wheat yields
Late blight of potatoes
How to make silage
Choose your irrigation method
Better grow berseem
How to make paddy straw a better cattle feed
Grow maize the improved way
Five fodder grasses that your can grow

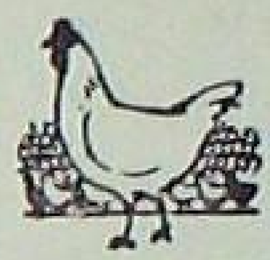
MANURES AND FERTILIZERS

Compost is easy to prepare
Green manuring
How to use fertilizers
Facts about fertilizers
Water hyacinth gives a good compost
Giant Hemp is a good green manure crop



HORTICULTURE

Papaya is easy to grow
Drumstick, the year-round vegetable
Growing grapes in south India
Rabi vegetables—grow them this way
How to grow paying pineapples



POULTRY

How to fight coccidiosis in poultry
Feeding poultry for profit
Do your hens pay ?
Protect your poultry birds against Ranikhet
Save your fowls from tick fever
Fighting fowl pox in poultry
How do you transport your poultry birds
Watch out for pullorum
Culling poultry for profit
How to make a brooder for your chicks
How to start a poultry farm
How to control lice on poultry
The egg and you
Tapeworms in poultry
Your chickens and infectious coryza
Making eggs keep fresh
How to pack eggs for transport
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Growing an intercrop is good, provided care is taken to see that it is well manured and is not grown very close to the base of the palm

Here's a work calendar for Maharashtra farmers

JANUARY

CLEAN the crowns of palms of all dying and decaying matter. Spray with one per cent Bordeaux mixture to prevent disease attack. It is better to add 0.2 per cent DDT with the Bordeaux mixture to help keep off insect pests too.

FEBRUARY

Hoe or cultivate the garden. Remove all grasses or shrubs and burn the same along with rubbish or trash.

In low-lying areas where coconut is planted on bunds, clean the channels between bunds and strengthen and level up bunds by adding to the sides and tops soil dug up from the channels.

MARCH

Look out for the leaf-eating caterpillar. Cut and remove all the affected leaves and spray the palms with 0.2 per cent DDT or BHC. Attend to watering also.

APRIL

Apply silt if available from tanks and channels between the palms. Spray against diseases with Bordeaux mixture in which DDT is added.

MAY

Plough the land twice or thrice and remove all weeds and grass. Sow a green manure crop such as wild sunnhemp, *dhaincha*, *Sesbania* or *kolingi*. Use 25 to 30 pounds of seed per acre for sowing.

JUNE

Bury husk if available. Repeat this operation after every five or six years.

Plant *Glyricidia* along the borders with a spacing of four to five feet. You can grow 300 plants on the border of an acre plot and get about 6,000 pounds of green leaves every year in two cuttings.

JULY

If possible grow tapioca between coconut rows. For this purpose, make raised beds. When planted cuttings put on four or five leaves, apply ash, and earth them up twice at a fortnight's interval.

AUGUST

Dig up and turn the grass and weeds and also the green manure into the soil. If there are heavy bunches in the palm, tie them up with a rope to the leaf stalks.

Clean the crowns and put a mixture of sand and BHC in the leaf axils. Pull out beetles and fill the holes also with the mixture. Spray all manure heaps or rubbish with 0.1 per cent BHC.

> If you are using cattle manure or compost or even ash as manure, always remember that their value depends upon how carefully you prepare, store and use them. Manures exposed to rain for a long time will be practically of no value.

SEPTEMBER

Apply a manure mixture in shallow basins dug round the palms, if you are on the West Coast. In case you have not raised any green manure crop, apply 52 pounds of green leaf per palm. Give the third spray with Bordeaux mixture and DDT.

OCTOBER

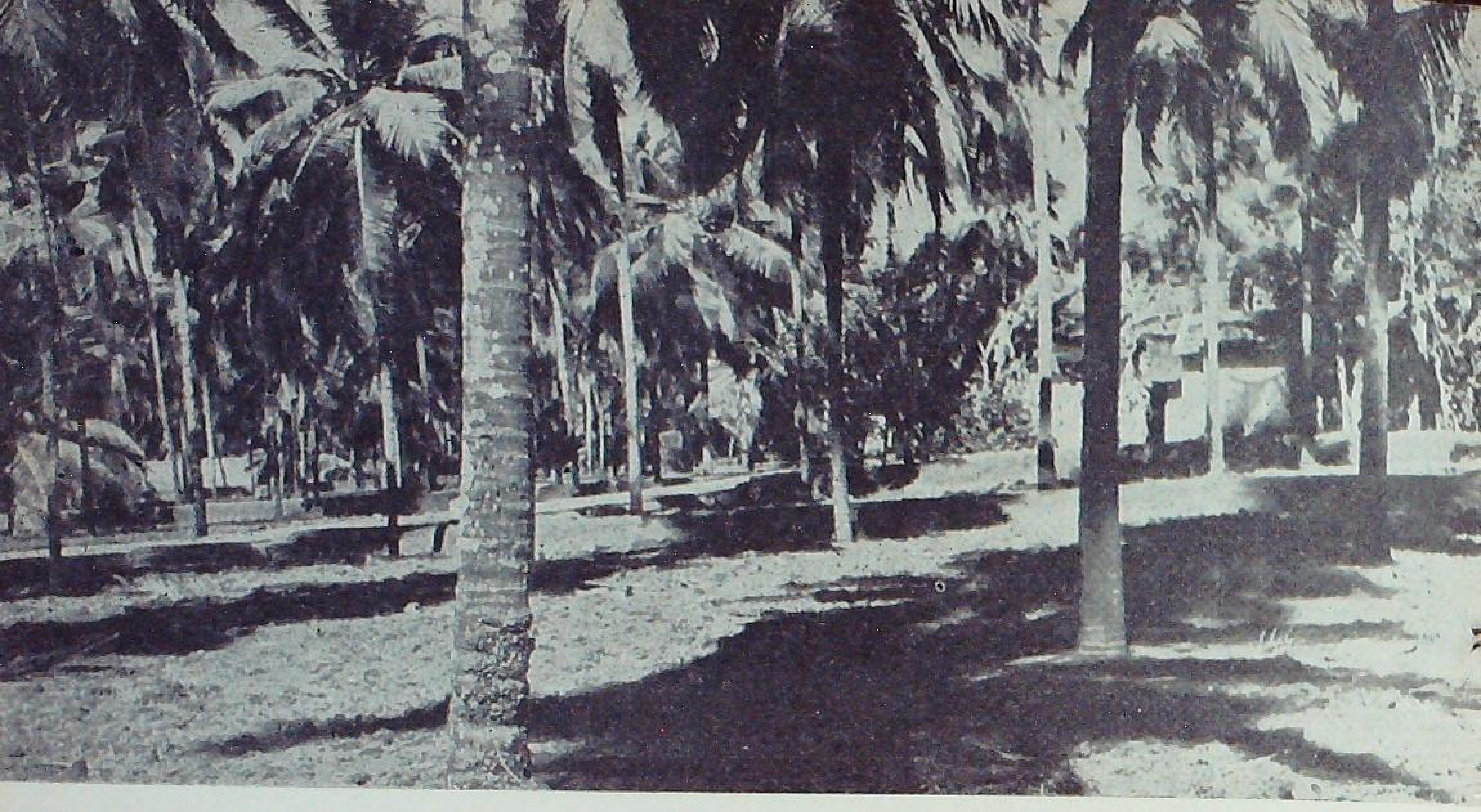
Tie up bunches. Remove rhinoceros beetle. Plough up the garden (if you had not done so in September). Make channels for irrigating the palms.

NOVEMBER

Weed the garden; clean water channels.

DECEMBER

You can plant a crop of yam this month. Dig pits two and a half feet in diameter and six inches deep spaced four inches apart for this purpose. Before planting, fill the pits with rubbish and burn.



ROUND-THE-YEAR
IN
MYSORE COCONUT GARDENS

ABOUT 70 per cent of Mysore's coconut gardens are in the rainfed tract which includes the districts of Tumkur, Hassan, Chikkamagalur and portions of Chitaldurg. Here, the water-table is fairly high and soil is sandy loam, slightly gravelly and is well-drained.

To get more nuts per palm, this is what you have to do in this area.

During January-March, cart jungle earth and heap it up in the different parts of the garden. You can also fold sheep.

Just before the pre-monsoon rains, spread out the carted earth (one to two carts per palm) and also cattle manure at the rate of 100 pounds per palm. Plough these in.

After one or two good showers, work a cultivator to bring the soil to a fine tilth. If there is sufficient moisture in the soil, sow a green manure crop, and cover.

In June-July, apply a manure mixture. If a green manure has been sown or if heavy rains are expected, apply this in basins round each palm.

In September-October, plough in the green manure. Plough the garden twice or thrice by the end of October.

It is a good rule to plant *Glyricidia* cuttings or seedlings on the field border. If the green manure crop fails for want of rains, apply green leaves at 75 to 100 pounds per palm.

IRRIGATED ZONE

Coconut is grown irrigated in parts of Chitaldurg and in Mysore and Bangalore districts. Here coconut is grown with areca and banana. It is almost a rule to plant banana suckers in a young coconut garden.

In this area, the soil is generally sandy loam or red loam.

Since coconut is grown mixed with banana or areca, you cannot plough the land, but you have to dig the garden. Give a good digging and remove all weeds just before the monsoon starts.

When you have brought the soil to a fine tilth, dig broad ditches in between coconut rows and heap the earth along the rows of bananas and coconuts. These ditches will act as irrigation channels during summer and drainage channels during the rainy season. Dig also crosswise channels at convenient intervals.

Since you cannot grow green manure crop because of bananas and areca in interspaces, grow *honge* or *Glyricidia* along the border. During May, apply green leaves and cattle manure at 100 pounds per palm round the base and irrigate the garden.

In June-July, stir the soil round each palm, apply a manure mixture, cover with earth and irrigate if there are not enough rains. Keep in mind that the garden should be free of weeds before you apply your manures.

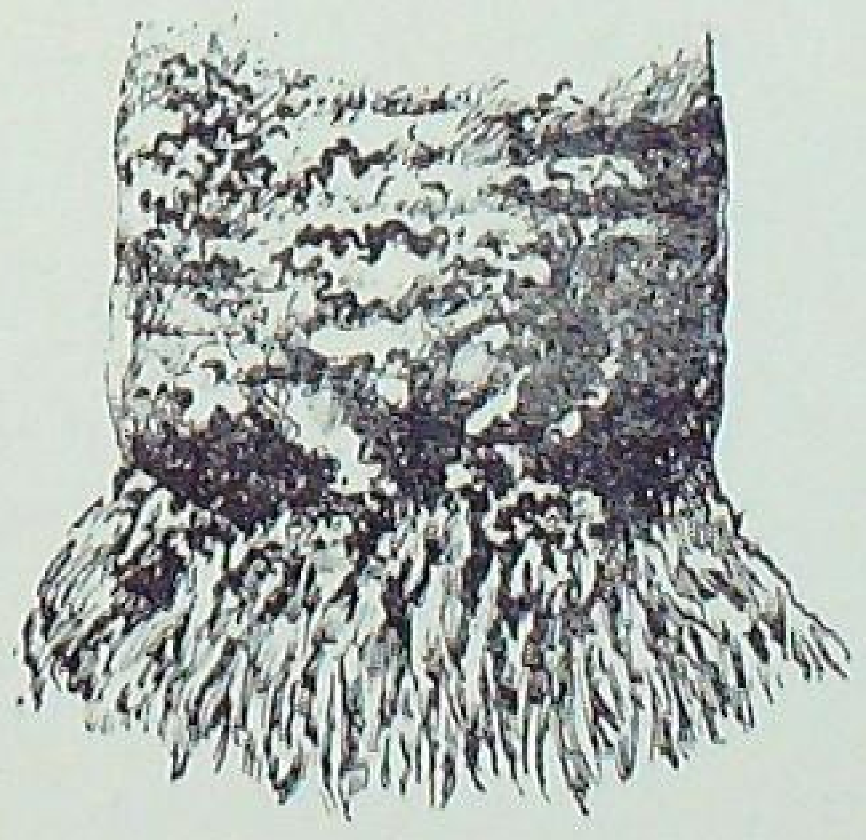
Give a digging or two in October, so that the soil is brought to a fine tilth.

COASTAL BELT

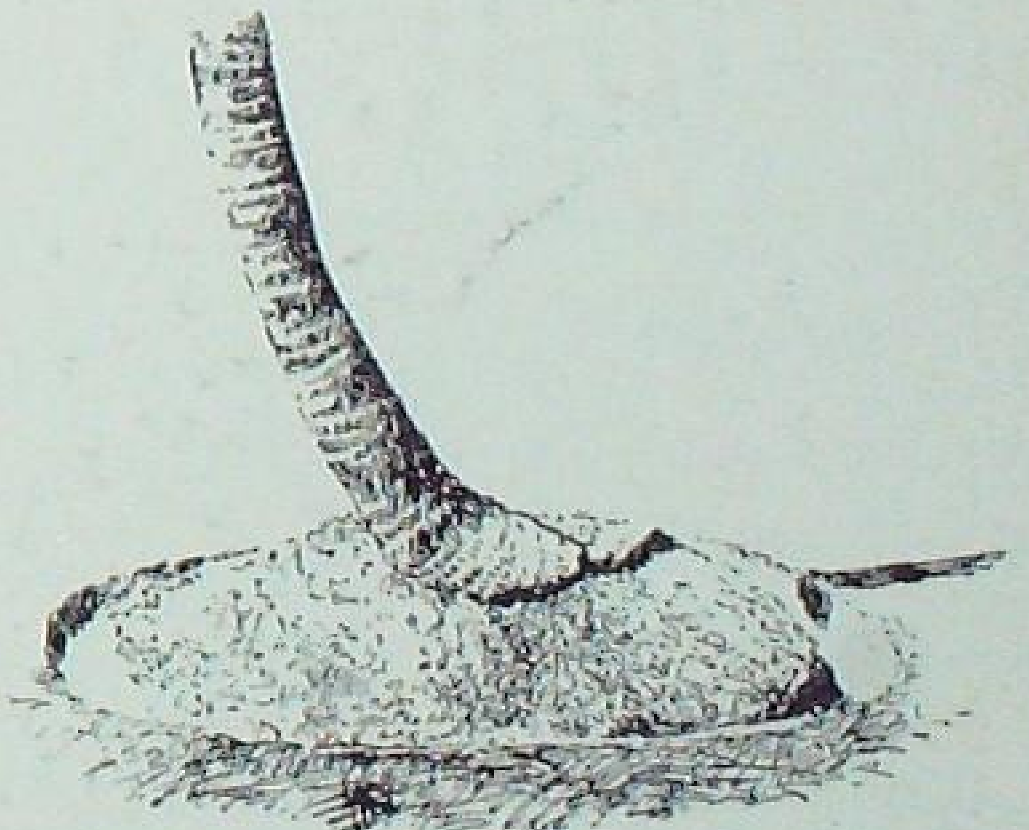
This includes the South and North Kanara districts, where the soil is laterite and sandy, and is generally poor in fertility.

(For cultivation and manurial schedule see 'Laterite Soil' and 'Sandy Soils' given under the article 'More Coconuts Per Palm')

ANABE ROGA



Anabe roga-*affected palm showing dark brown patches at the bottom of the trunk*



Isolate such a tree by digging a trench round the base

This disease of the palm is found in some areas of Mysore State as in Tumkur and Hassan districts. Where there is disease attack, the roots become dry and brittle. A brownish sticky liquid oozes out of the trunk; trees slowly die in two or three years.

When you see palms suffering from *anabe roga*, uproot them completely and destroy them, so that the disease may not spread to other trees. Apply fine sulphur powder to the soil round the palm; this also prevents this disease from spreading.

Give the trees in your garden good cultivation and manures, so that they can be strong enough to fight the disease.

A Work Programme for Madras Coconut Growers

THIS is what the Madras coconut grower should do month by month to get better yields from his palms.

MARCH-APRIL

Plough the garden once to get it ready to receive the summer showers.

JUNE-JULY-AUGUST

With the receipt of soaking showers, give a basal dressing of ash at 20 pounds per tree or cattle manure or compost at 50 to 100 pounds per tree.

Sow a green manure crop of sunnhemp, *Crotalaria striata*, *Calopogonium mucunoides* or *kolingi*.

In sandy soils or in places where such green manure crops cannot be grown, plant quick-growing, green leaf-yielding plants like *Glyricidia maculata* along the borders of the garden.

SEPTEMBER

Slash or cut down the green manure and plough it in with an iron plough.

Broadcast ammonium sulphate (or the nitrogenous fertilizer you use); plough in along with the green manure crop at the first or second round of ploughing. If cattle manure or compost had not been applied as a basal dressing for the green manure crop, apply now, and plough in.

OCTOBER-NOVEMBER

If you had not applied ash, apply it broadcast now and work a cultivator to mix it with the soil.

←A green manure crop growing inbetween the nursery and the grown-up palms

DECEMBER-JANUARY

Work the cultivator again to remove weeds and create soil mulch.

FEBRUARY

No operations.

Better Practices Pay in Andhra Pradesh Too

In Andhra Pradesh, coconuts are raised in loamy soils in the Uddanam area of Srikakulam and Visakhapatnam districts.

On the East Coast, the coconut is found on the sandy soils.

In the delta areas, the soil is alluvial, and here too good coconuts are raised. Laterite soils are not normally met with in Andhra Pradesh.

Coconut farmers in Andhra Pradesh can very easily follow the recommendations given in the article 'More Coconuts Per Palm,' depending upon the soil type they have.

What West Bengal Farmers Should Remember

They will do well to follow the recommendations given for loamy soils in the article—'More Coconuts Per Palm.' They should pay special attention to the planting of *Glyricidia* for green manuring. They should also :

*cultivate the garden at regular intervals;

*irrigate the garden where there is facility for doing so;

*pay special attention to the control of rhinoceros beetle and leaf rot disease.

Provide the mature trees with the fertilizers they need; they will give higher yields

Practices Orissa coconut growers can follow with profit

Coconut is grown in the four coastal districts of Balasore, Cuttack, Ganjam and Puri in Orissa. Four-fifths of the area is in Puri, where it is mostly grown in loamy soils. In the Ganjam district, the palm is grown on gravelly laterite soils and in loamy soils which tend to be sandy. In Cuttack, the palm is found on sandy loam or sandy soils. In the Balasore area, it is grown on sandy soils and in reclaimed backwater areas (*char* lands).

Here is the month-by-month operation to be done by the Orissa coconut growers.

January

Weed the garden. Water old palms in laterite and sandy soils once a week in shallow basins dug around the tree. Where palms are planted on bunds, strengthen the sides of bunds. Spray with 0.2 per cent DDT after cleaning the crowns of palms if there is an attack from leaf-eating caterpillar.

February

Remove stray shrubs and grasses and burn them. This month and the next the black-headed caterpillar does the worst damage. Hence spray the affected and adjoining palms with 0.2 per cent DDT twice, at an interval of 15 days. Clean all water channels. Use the earth from the channels to strengthen the bunds on which coconuts are grown.

March

Clean up the channels and banks and put back the soil removed from them on the bunds. If there is a severe drought, irrigate the palms. Water the seedlings at least twice a week. If there is a caterpillar attack, give 0.2 per cent spray. Wherever possible, pen sheep and cattle.

April

Continue cleaning and deepening of channels and tanks. Strengthen the bunds. Prepare for planting monsoon vegetables.

May

Sow your green manure crop with the pre-monsoon showers. Cart in clay or sand, depending on whether the soil is clay or sandy. Start sowing winter crops like ginger and colocasia.

June

Dig basins round the palms. Apply green leaves and cattle manure at the beginning of the south-west monsoon. First apply the green leaf at 50 to 100 pounds per tree, then spread cattle manure at 100 pounds per tree. Cover with soil. Towards the end of the monsoon, apply manures such as bone-meal and cover the basins completely.

July

Catch and kill the rhinoceros beetle. Apply manures to your vegetable crops. Transplant *Glyricidia* cuttings from the nurseries round the garden.

August

Dig up grass and weeds and turn them into the soil. Clean the crowns. Tie up tender bunches. Prepare for sowing winter vegetables. Continue controlling rhinoceros beetle.

September

Apply manure mixtures in basins round the palms. Plough up the garden.

October

Complete ploughing the garden in low-lying areas. Dig the soil and pile up into mounds. Tie up bunches. Continue preparing land for winter vegetables.

November

In low-lying areas, dig or plough the land to conserve moisture. Remove weeds and grass plants and burn them. Transplant winter vegetables.

December

Level down the soil mounds in the low-lying areas. Where facilities exist, irrigate the palms.

HOW TO MAKE YOUR SPRAYS

BORDEAUX MIXTURE (ONE PER CENT)

What you need : 5 pounds of copper sulphate, 5 pounds of quick lime and 50 gallons of water.

How to prepare : Take 25 gallons of water in a wooden, earthen or copper vessel. Put five pounds of copper sulphate in a piece of gunny and suspend it loose in the water.

Slake the quick lime by sprinkling some water on it and then make it into a creamy paste free from lumps by adding some water. Add the remaining quantity of water, stirring all the while. Milk of lime results. Strain this into another wooden or earthen or copper vessel.

Pour the copper sulphate solution into the milk of lime, stirring well all the time. The mixture is now ready for use.

Prepare only just the quantity required for immediate use. You cannot keep Bordeaux mixture for a long time. If, however, some mixture is left over for the next day's use, add sugar or *gur* to it at half pound per 50 gallons of the mixture.

BORDEAUX PASTE

What you need : 1 pound each of copper sulphate and quick lime and 2 gallons of water.

How to prepare : Dissolve the copper sulphate in 1 gallon of water. Slake the quick lime by sprinkling a little quantity of water over it and make it into a creamy paste. Add the rest of the water. Pour the copper sulphate solution into the lime solution and stir well. The mixture is now ready for application.

BHC (0.1 PER CENT SPRAY)

What you need : 1 pound of 50 per cent wettable BHC powder and 50 gallons of water.

How to prepare : Sprinkle small quantities of water over the powder and work it into a creamy paste, add rest of the water to the paste, stirring all the time. The solution is now ready.

DDT (0.2 PER CENT SPRAY)

What you need : 1 pound of 50 per cent wettable DDT powder and 25 gallons of water.

How to prepare : Add small quantities of water to the powder to make it into a creamy paste. Then add rest of the water and stir well.

PYROCONE E (ONE PER CENT SOLUTION)

What you need : 1 part of 'Pyrocone E' and 100 parts of water.

How to prepare : Add the chemical into the water and stir well. The solution is then ready for use.

The many enemies of coconut

And a good coconut grower must know at least the most important ones and what to do about them

THE coconut has many enemies. Some of them are pests, and some diseases. If you do not fight them, you won't get the best profits from your garden.

RHINOCEROS BEETLE

Among the pests is the rhinoceros beetle or the black beetle. It is the worst pest of coconut. You can recognize the beetle by the horn-like projection it has on its head. It attacks the crown and bores into the tender parts, especially the axils of leaves.

Where there is rhinoceros attack you will find small lumps of chewed-up material at the entrance of the hole it bores and also cuts on the new leaves that come out. Naturally, the yield of the palm goes down.

To control the beetle :

Search the palm from time to time for the beetle ; extract it with a beetle hook and kill it.

Spray all the decaying organic matter in the garden, compost heaps and manure pits with 0.1 per cent BHC. This prevents the beetle from multiplying. Spray every three months.

Fill the axils of newly developing leaves with a mixture of sand and 5 per cent BHC. This will keep away the beetles.

BLACK-HEADED CATERPILLAR

Next to the rhinoceros beetle comes the black-headed caterpillar. It scrapes the green matter of the leaves, constructs tunnels or galleries with the silk it produces and continues to feed on the leaves.

The infested leaflets dry up. If a large number of leaflets are affected the trees look burnt out. The nut yield is cut down to a large extent.

To control the caterpillar :

Promptly cut and burn all the leaves attacked in the early stages.

Spray 0.2 per cent DDT (one pound of 50 per cent wettable DDT in 25 gallons of water) as soon as you see the caterpillar attack.

When the caterpillar attack is seen over a large area, seek the help of the Agricultural Officer or Gram Sevak. He will get you a parasitic insect which will feed upon the caterpillar.

PALM WEEVIL

Another pest that damages the palm is the red palm weevil. You know it by its red colour and prominent curved snout. Most of the damage is done by its grub which bores into the trunk just below the crown and feeds on the plant tissue.

It is difficult to spot it out in the early stages. But once the central shoot dries up, and fibrous matter is seen at the bore holes you can be sure that the weevil is there.

To control it :

Clean the attacked portion of the palm.

Close all holes excepting the top-most one with cement. Through the open hole, pour 1000 to 1500 C.C. of one per cent Pyrocone E. When the fluid is completely absorbed, close this hole also.

Poor management only helps the spread of diseases; if it is wilt, fertilize and cultivate the soil

Treat the bud rot-affected crown and protect the tender head from further damage

TERMITES

The termite also likes the coconut tree. It goes into the husk and tender roots of seedlings. It damages the seedlings in the nursery and also transplanted seedlings in their early stage.

Probably you will discover that the termite is there when the seedlings start withering, a stage at which it is too late to save the seedlings. The loss is severe when the tender growing joints are nibbled at by it.

The control measures are :

Dust the soil with 10 per cent BHC at one hundred weight per acre in the nursery to prevent damage to seed-nuts.

When young plants are attacked, pour one per cent solution of BHC (1 pound of 50 per cent wettable BHC in 50 gallons of water) in sufficient quantities round the trunk on the soil.

RAT TROUBLE

Neglect your garden and you will be only inviting rat trouble. They make holes in tender nuts. As a result, the nuts fall off.

Where there is rat trouble you will find plenty of young nuts scattered around the tree. The rat damage is greater in closely-planted and neglected gardens.

To control rats :

band the trees,

set up rat traps,

keep poison baits. But use them with care as they are harmful to human beings and animals as well.

Like the pests, diseases too visit your coconut garden. There are many serious ones and if you do not take prompt action to fight them, they can kill the palms outright.

BUD ROT

Bud rot is the one to be feared most. It attacks the palm at all stages.

It starts on the youngest visible leaf in the crown. Then it spreads to the base of the other leaves, finally affecting the tender head.

The infected leaves turn light greenish first. Later they become dark brown and finally bend and break at the base. The tree dies, giving out a foul smell from its rotten tissues.

Check the disease this way :

Remove all the affected tissues in the early stages. Then spray the affected portion as well as the crown with one per cent Bordeaux mixture.

Cut and burn the palm if the disease has advanced far, and spray all the trees in your garden with one per cent Bordeaux mixture.

STEM BLEEDING DISEASE

A disease that slowly weakens the palm is the stem bleeding disease.

A reddish brown liquid oozes through the cracks in the stem. This liquid, on drying, leaves a distinct mark on the stem.

To treat the tree :

Chisel and completely scoop out the diseased tissue and paint the portion with Bordeaux paste.

Avoid injuring the tree. If there is any injury, apply coal tar or white lead paint.

ROOT DISEASE

This one attacking the roots makes the whorls of leaves turn yellow and droop. The leaflets curl slightly at the tip, become brown later. They start drying up from the tip. Immature nuts fall down.

As the disease progresses, the new-formed leaves get smaller and smaller in size. The kernel inside is affected and finally the nut yield is hit.

The disease can be kept under check by regular cultivation and manuring and by improving drainage.

LEAF DISEASE

The disease attacking the leaves starts with the central shoot. Reddish brown spots and patches appear on the tender leaves. These spread inside the shoot. The shoot softens and rots.

As the weather becomes dry the blackened and shrivelled tips of leaflets dry up. They break up drooping down like a fan. Finally the tree weakens and dies.

To control the disease :

Spray the leaves with Bordeaux mixture once in April-May before the monsoons, once in September-October between the south-west and north-east monsoons and again in December-January after the north-east monsoon. Add 0.2 per cent DDT to the mixture while spraying.

Keep your garden trim and in good condition.

Follow these methods and do not let these pests and diseases cut away your profits.

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The water that coconut seedlings need

THERE is one very important thing that the young coconut seedlings need more than anything else—moisture—especially during the summer months. This need is greater if you have planted the seedlings in a sandy soil.

At the height of summer, when moisture dries up, the seedlings you have planted stop growth and all but a few dry up. They face the hardship more during their first summer.

If you can irrigate them, well and good. But if you cannot, you have to think of other ways of keeping enough moisture in the soil.

One way of doing it is to change your method of planting. This is what you should do :

Dig seedling pits a little larger in size, say, about 3½ feet deep, 4 feet square at the top and 3 feet square at the bottom. In the bottom of the pit, arrange dry coconut husks (which were not exposed to rain before) with the concave face up. Make two or three layers of them, nine to twelve inches thick. After each layer, fill the inter-spaces with soil.

Plant the seedling in the centre of the pit on top of the husk layer. Arrange some more husks round it. Put more soil into the pit till it reaches the collar of the seedling. Press it down firmly. Provide a support for the seedling.

Plant the seedling at the beginning of the monsoon, so that the husk can absorb and keep the water. The good effect of burying the husk lasts for two or three years by which time seedling would have got over the bad period, and would have developed a good root system to fight drought conditions better.

If husk is either too costly to use or is not available, you can use coir-dust or saw-dust instead.

Plant the seedling in the usual manner. At the close of the monsoon, spread the coir-dust or saw-dust on the surface of the soil in the pit, two or three inches thick. See that the material does not touch the collar portion of the seedling. This layer will reduce the loss of moisture.

You will have to renew this mulching every year at the close of the monsoon.

The practice will be of great help in preserving moisture in sandy soils. But remember, burying husk or mulching with saw-dust or coir-dust is not a substitute for watering.

FACTS YOU SHOULD KNOW

*IF OILCAKES are available cheap in your area, apply them instead of ammonium sulphate to the coconut. You will have to apply 20 to 25 pounds of the cake to each tree.

*YOU can adopt the manurial schedule shown against one soil type or another type, if you so like. But for a sandy soil it is better to use organic manures than chemical fertilizers.

*IF YOU find it difficult to prepare your own manure mixtures, you can buy ready-mixed coconut manure mixtures from a reliable firm.

*WHENEVER possible, grow a short-term subsidiary crop in the interspaces of your garden. But see these crops are separately manured. Don't grow them right up to the base of the coconut palm. Leave an area of six to eight feet radius round the tree, so that you can go ahead with manuring the palm at the right time.

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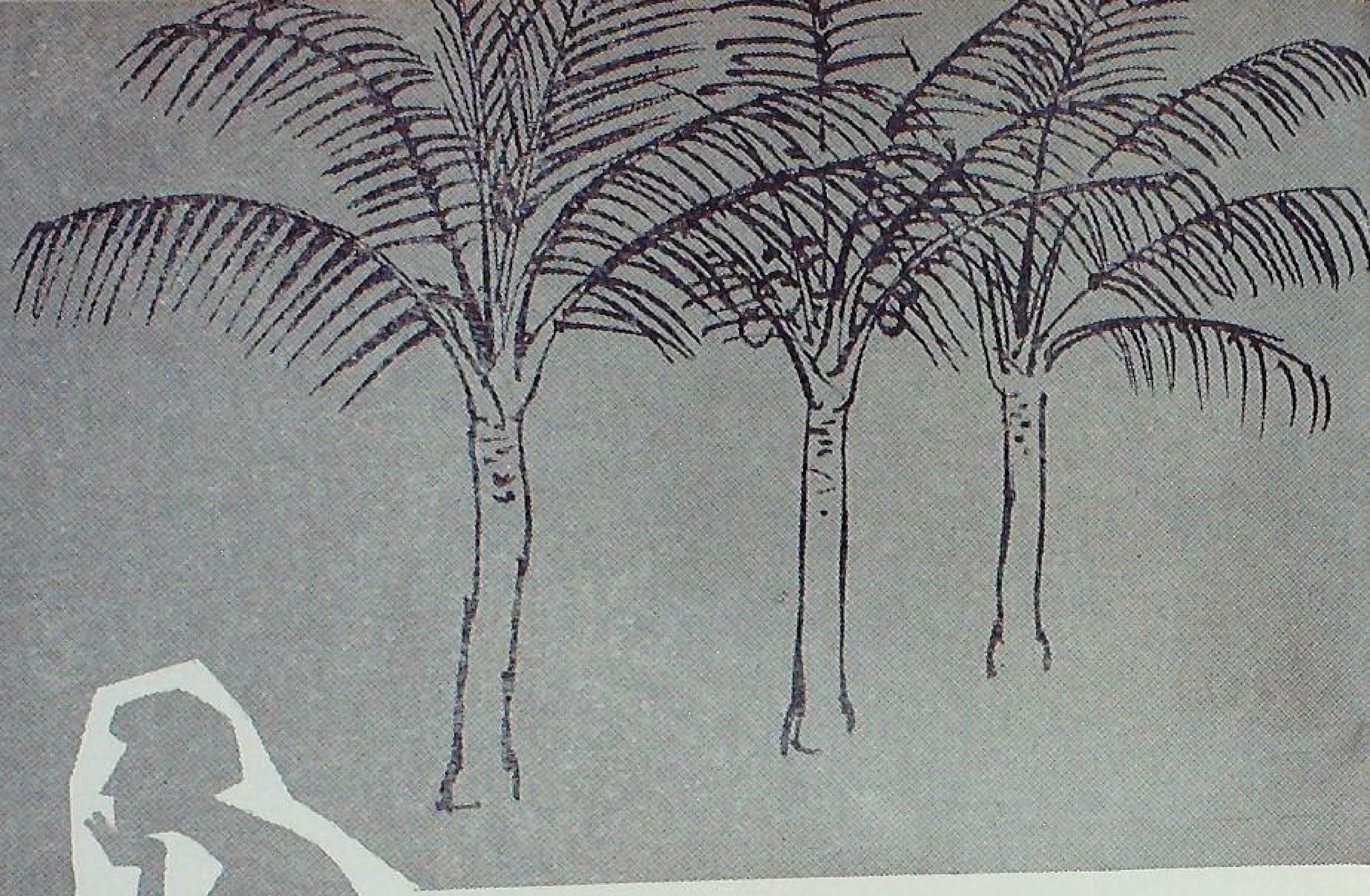

Is this your problem too?

BUTTON-SHEDDING IN PALMS

In some palms, buttons (young undeveloped nuts) drop off. This becomes serious if the number of buttons shed is very large.

Button-shedding may be due to several causes. It may be an inborn character of the palm. In spite of all you do, excepting for one or two buttons, all the rest fall off as soon as the inflorescence opens. With such palms you can do nothing to stop the shedding.

In some cases, buttons fall off when there is severe drought. The best way to solve the problem is to irrigate the palm. If you have no means of irrigating the palms, then you can grow a green manure crop and plough it in at the time of flowering. Also till the garden towards the end of the north-east monsoon.

Button-shedding in some cases is a result of diseases. Pick up a few buttons and see if they have some discolouration at the portion near the calyx. If that be so,

spray Bordeaux mixture or 'Perenox' on the inflorescences when they open to end the trouble.

THE UNTHRIFTY PALM

WHEN can a palm be called unthrifty ?

When it produces poor yields, and the returns you get from it are not sufficient for meeting the expenses on it by way of cultivation and manuring, the palm is unthrifty.

Trees which give an annual yield of ten nuts or less, in spite of the reasonable attention you give them are unthrifty.

TAPPING THE PALM

DOES tapping of palms help ?

It does, in unproductive coconut trees. Some trees give a poor yield because of poor setting or because of the low number of spadices produced.

These trees, of course, will give a poor yield of juice (*nira*) when tapped. But it will help increase the yield later.

Tap such trees for six months and leave off for the next two or three years to let the trees produce nuts. Tap again after that, if necessary.

CUTTING STEPS

SOME cut steps on coconut trunks for climbing. Is this harmful ?

It is. In cutting steps, large slices of wood are removed from the trunk, leading to serious injury to the palm.

In many cases, the fresh wound surface rots. A cavity gets formed, and a foul smelling liquid gets collected. The palm gets weak. It is also exposed to diseases, such as the stem-bleeding disease.

Once it gets the disease, the palm dies.

UNDERPLANTING IN COCONUT GARDENS

WHEN your coconut palms get old you underplant the garden, which means removing the old plants and planting young ones in their place. Normally, palms get old and produce fewer nuts after they are sixty years old. Surface-planted palms age earlier. You take up underplanting also in places where palms have died or fallen off.

But never start underplanting when the trees are middle-aged and the plantation is yielding well, because the young plants will compete for food with the older ones.

To underplant, remove all old trees and those which produce less than ten nuts a year. Remove them along with their stumps and roots to a radius of about five feet.

Plant the new seedlings a little away from the place where the old trees stood, but taking care that they are placed at a proper distance from the other trees.

To plant, dig sufficiently large, say, three feet to four feet cube pits, and fill them to the required depth with good made-up soil. Manure the seedlings properly after they establish. Also give a deep digging or ploughing around the newly-planted seedlings to break the matting of roots of the old trees.

When a green manure really pays

GROWING A GREEN MANURE CROP IS A LITTLE DIFFERENT FROM GROWING A REALLY PAYING GREEN MANURE CROP

SURE, you want to grow a green manure crop in your garden. But the crop you grow should be really a paying one.

To make it pay, you have to remember eight important things that go with growing green manures.

To get better results with green manuring, spread a manure mixture over the basal application of green leaves

One. Fertilize the soil before you grow the green manure crop. Coconut soils being poor in fertility, apply (broadcast) a fertilizer at least in the first few years. Better apply a phosphatic fertilizer. It will not only help the soil fix more nitrogen, but also make more phosphoric acid available in the soil. The green manure crop will also yield high.

Two. In some soils the bacteria which form nodules on the roots of the green manure plants may be missing. In such soils, have the seed 'inoculated' with the bacterial culture before sowing. Ask your Agricultural Officer how this can be done.

Three. Sow your green manure crop thick, using a higher seed-rate and a closer spacing.

Four. Some green manure seeds need to be treated before sowing. Ask your Agricultural Officer how this is to be done.

Five. Cut the crop when it starts flowering. If you do it earlier, the yield will go down. If done later, the plant will be woody. Remember, the crop grown for green manure should not be left over for collecting seeds.

Six. Mix the green plant material well with the soil. Pull up the plants by the roots and lay them in bundles in plough furrows Let these be covered by the next plough furrow. You can also chop the plants, spread them over the field and cover by ploughing or digging. But if you bring leaves from outside, apply them in basins dug around the trees and cover. Give each tree 50 to 100 pounds of green leaves.

Seven. See that the green manure crop is applied in the green stage itself when there is enough moisture in the soil. Bury it deeper in lighter soils than in heavier ones. If rains fail after you have applied the green manure, irrigate the garden, if you have the facility.

Eight. Remember, green manuring is a practice of 'timings.' Hence, work out the correct time of sowing and the correct time of cutting the green manure crop you have sown.

With attention to these points, green manuring will surely be a paying practice.

Trees on bunds ?

IT IS EASY TO MAKE THEM YIELD HIGHER

THERE is a good way of making your coconut palms planted on bunds give you good yields.

Dig rectangular basins around the palms standing on the bunds. Dig the soil on top of the bund and form ridges on its edges and also between every two palms. This way, rain water falling on the bund will be soaking in instead of flowing away.

Next, dibble cowpea seeds on the ridges. Cowpea roots will keep the ridges intact.

Put as much green manure as possible in the basins, and, over this, whatever cattle manure you can put in. Spread two pounds of ammonium sulphate and two pounds of bonemeal. Cover the basins.

By September-October, you would have harvested the cowpea. Cut the stems of the plants and put them in the basins. Don't disturb the roots of the cowpea.

Apply to the palms available ash before the end of the north-east monsoon. Cover the manure with soil trimmed off from the inside of the ridges.

When the water in the canal between rows dries up, dig up the canals and earth up and strengthen the bunds. When you do this, the top of the bund will have a concave shape. This helps bunds retain water from occasional summer showers.

If you do all these, there is no reason why you cannot get 75 to 100 nuts per tree every year.

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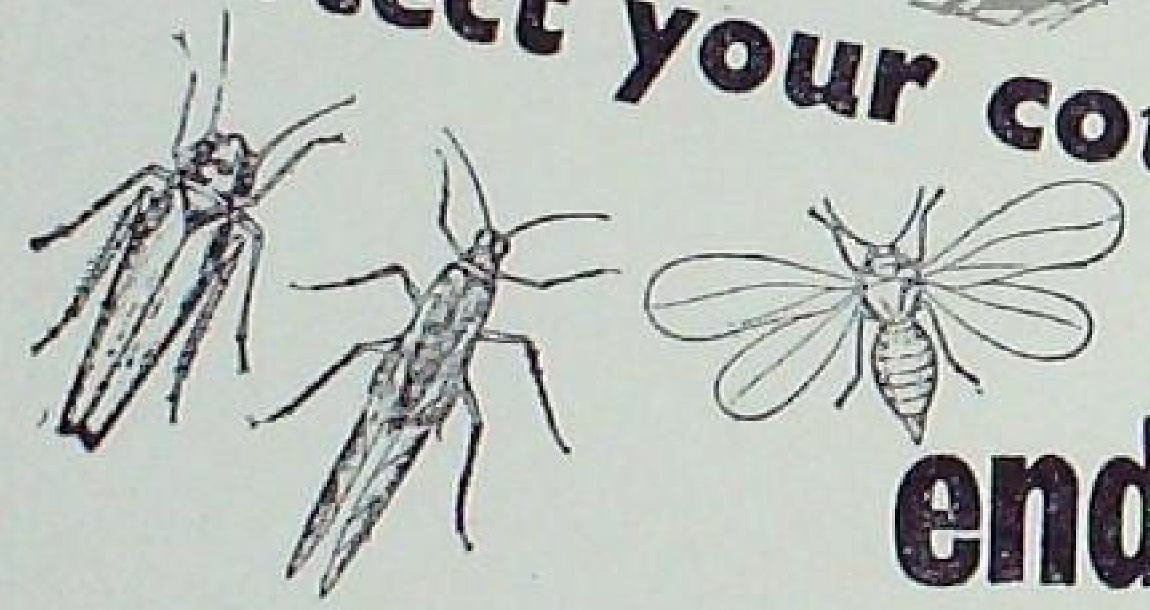

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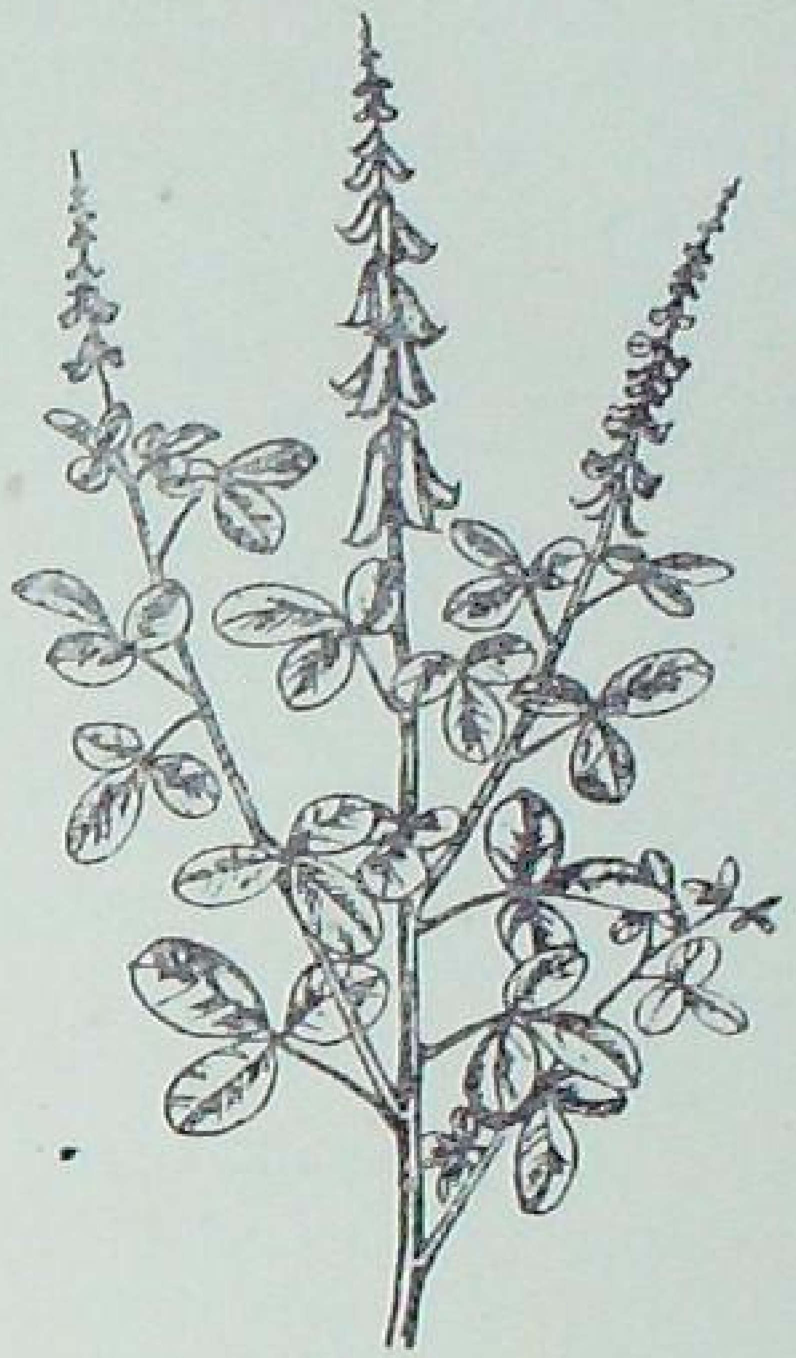
Sunnhemp



Crotalaria striata

Sesbania

GROW A

GREEN MANURE CROP

BUT SELECT THE ONE THAT BEST SUITS YOUR GARDEN

COCONUT farmers who want to grow a green manure crop in their gardens, often wonder which one to grow.

Field trials and experience point out quite a few green manure crops for growing in the gardens. Here are a few tried out by many farmers with good success. But before you select any one of these, see that they fit in with the local conditions of your area.

Wild Sunnhemp

This is a hardy crop. It grows on any type of soil and can stand drought as well as heavy rains. It is neither eaten by cattle nor bothered by any serious pest. But it is somewhat woody. Sow the seed at such a time that the crop gets established before the monsoon starts. Sow it in April-May if you are on the West Coast. Seed-rate is 20 to 25 pounds an acre. Pound the seed with sand, sow broadcast and cover with a light plough or a harrow. It will get ready for ploughing under in September. You can get about 10,000 pounds of green matter from an acre.

Sunnhemp

It is to be raised in the monsoon. Sow its seed at 30 to 40 pounds per acre, after the garden has been ploughed once or twice. Cover the seed with a light plough. On the West Coast, sow the seed early in April-May when you receive pre-monsoon showers. It will come up well on all types of soil. When conditions are good, the crop will give a very juicy green matter in about two to two and a half months' time. The crop, however, depends so much on the rains for its growth that you may get either a poor or a bumper crop depending on the rain. Poor crop may also result due to pest attack.

Dhaincha

When the south-west monsoon rains are received, sow the crop at 25 pounds of seed per acre. In four months, *dhaincha* would be fully grown. It doesn't mind drought, water-logging or saline conditions. The crop gives better yields on heavier soil types. It is, however, not suitable for growing in overcrowded gardens.

Wild Indigo

This is grown on the lighter soil types of Andhra Pradesh. It is not eaten by cattle. Sow the seed after pounding with sand between June and October The crop is somewhat slow in its growth. It will give you about 5,000 to 6,000 pounds of green matter per acre.

Calopogonium mucunoides

This is a green manure-cum-cover crop and has been recently introduced into the West Coast. Sow the seed broadcast in May-June, at eight to ten pounds per acre after you have brought the garden to a good tilth. It will grow speedily and form a thick layer over the ground. It should be cut and ploughed under in August-September. The crop will provide 8,000 to 10,000 pounds of juicy green matter per acre. If it is grown for the first time, the crop may not be chopped for two years. If you do not plough in the crop in time, it will get dried up by January, and you will get a very good crop from the self-sown seeds in the next monsoon.

Cowgram

When the south-west monsoon is received (June-July), dibble the seed in shallow plough furrows, using a seed-rate of 50 to 60 pounds per acre. It can be ploughed in after three months. The crop, however, should be guarded against caterpillar attack.

If your garden is too small, you can grow a green manure bush like *Glyricidia* along the borders of the garden.

Glyricidia

You can raise *Glyricidia* both from seed and from cuttings. Cuttings give better results. Get these rooted first and then plant out in the field borders five to six feet apart. Within a year or so, the plants will be ready to yield 10 to 15 pounds of green leaf each. They will give all the green matter you want, as and when they grow up.

If you do not want to bring the whole area under green manuring, better grow it in one portion of it at a time and in other at other time. In this way every bit of land will get the benefit of green manuring.

See which one of the green manure crops is best suited to your garden.

A DELICIOUS CAKE FROM RAGI

By DOLLY DAVID

HOME-MAKERS in the South, who use the millet *ragi* as a staple food, must be waiting for someone to tell them what good dish they can prepare from it other than *chapattis*, *ragi* balls or gruel.

Ragi no doubt is a nutritious grain, but it certainly is monotonous to have the same dishes day in and day out.

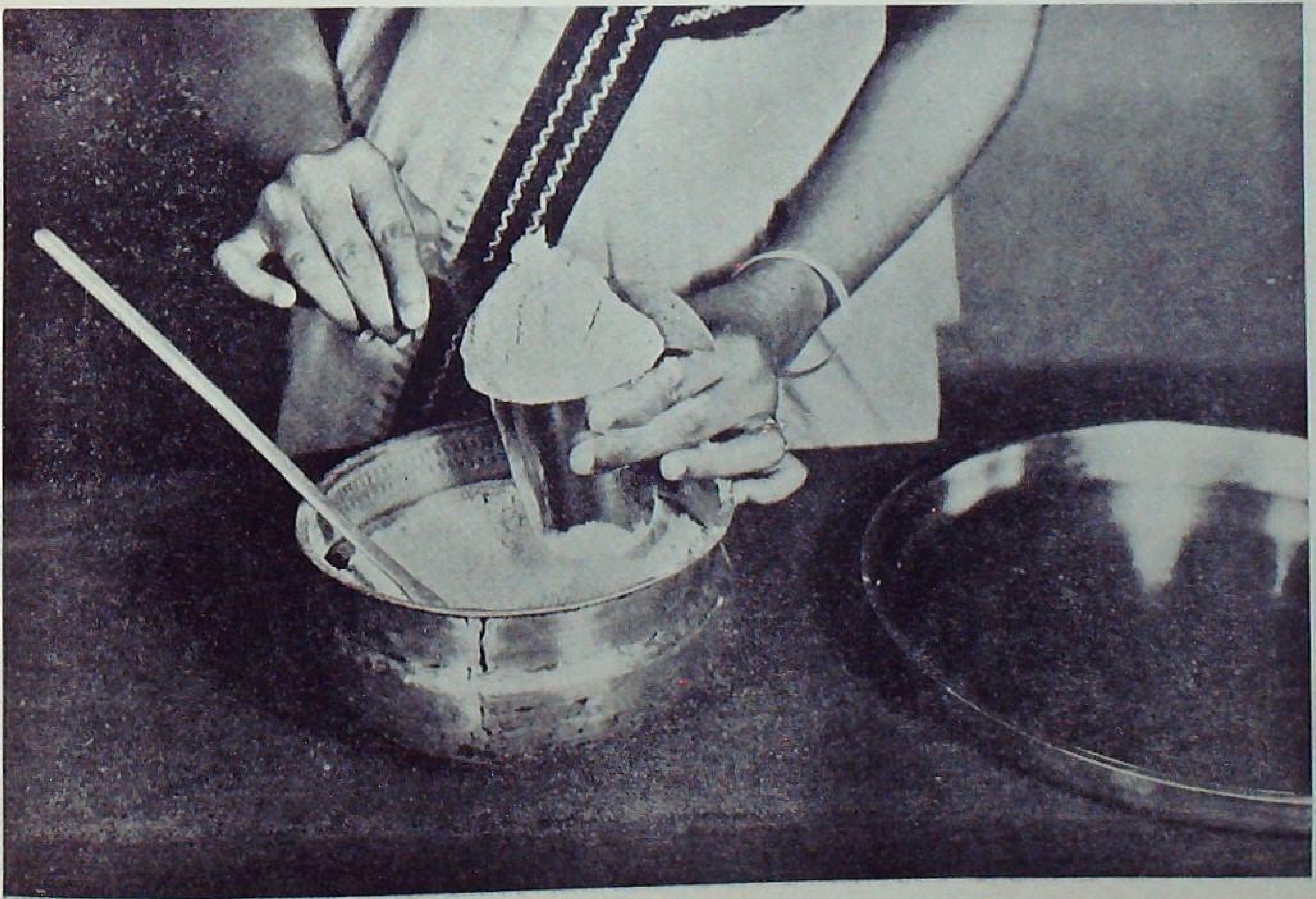
To these home-makers and others, here is a new idea: make a delicious cake from *ragi*.

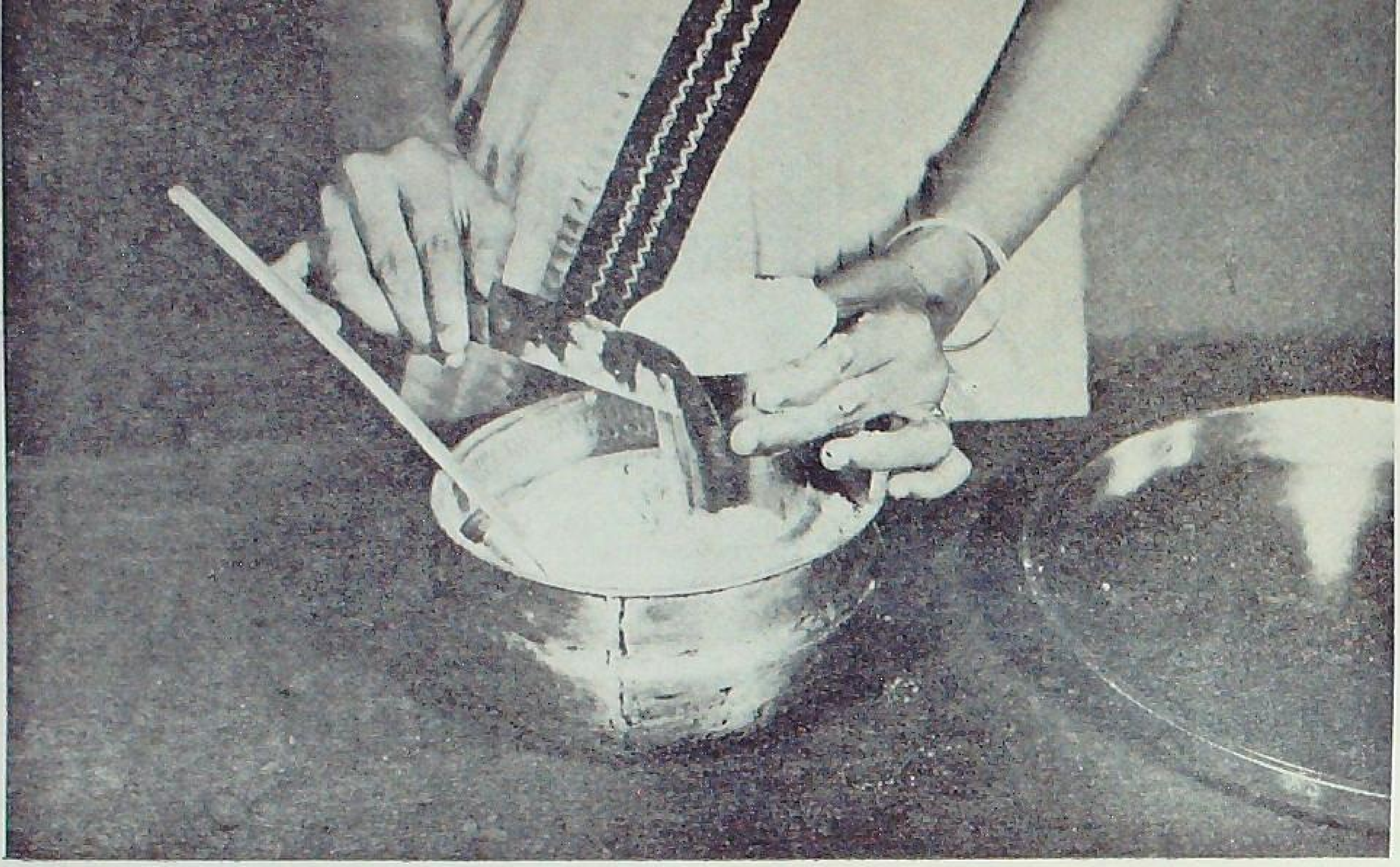
To make this cake, you have to take to steam cooking. The materials kept in one vessel are placed on another in which the water is kept continuously boiling. The vessel should be closed with a tight-fitting lid, so that no steam escapes. The food cooks with the steam produced.

To make the cake, you need:

Ragi flour	1/4 seer (8 ounces)
Scraped fresh coconut	1/2 *pav* (4 ounces)
Jaggery (*gur*)	1/4 *pav* (2 ounces)
Groundnut	1/8 *pav* (1 ounces)
Water	1/2 seer (1 pound)
Salt	1 teaspoonful

Measuring out ragi *flour*





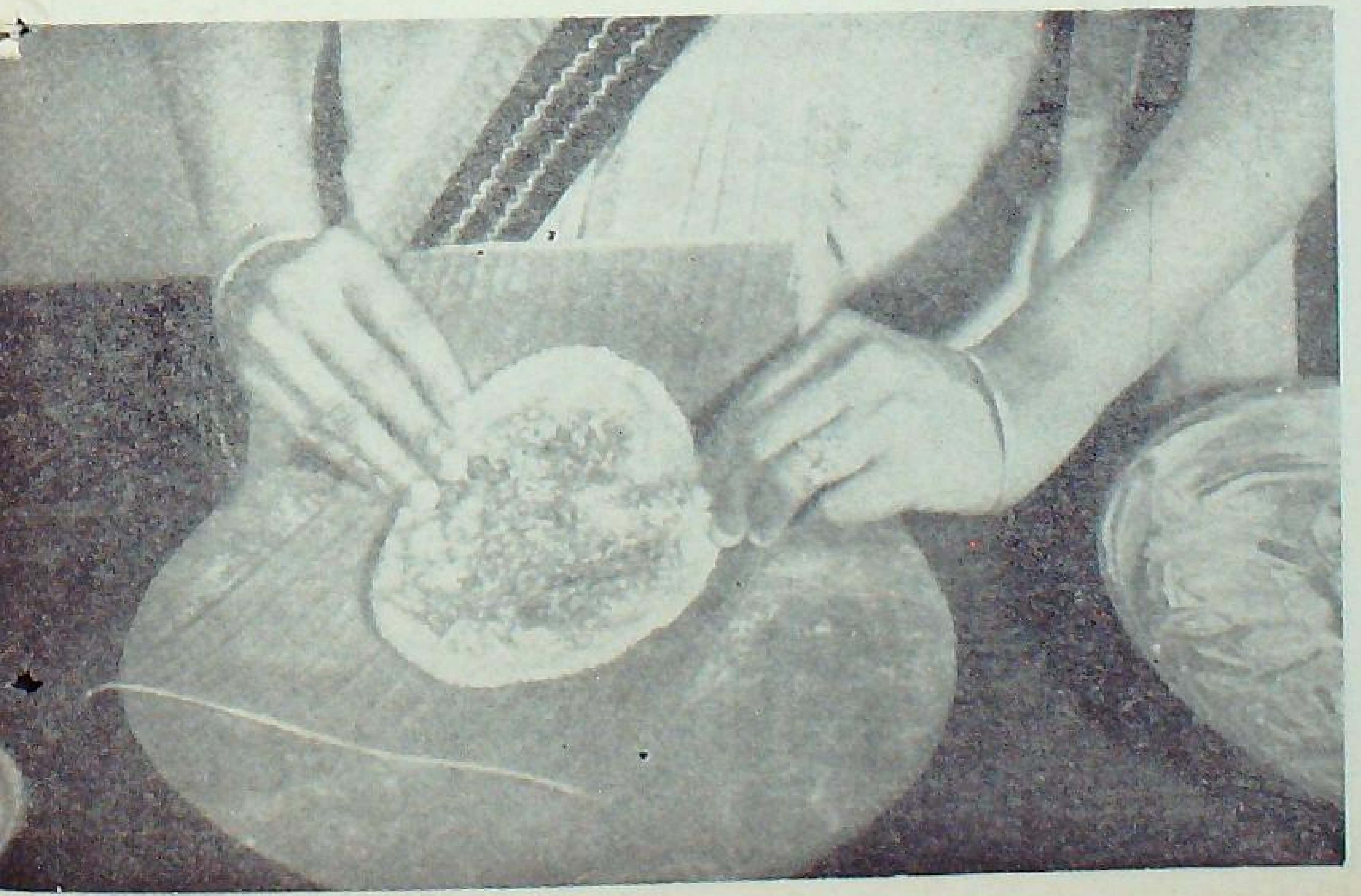
Levelling the measured flour with the knife-edge and preparing the dough

Flattening the dough balls on a plantain leaf

This is how you make the cake:

- ★ First measure out the *ragi* flour.
- ★ Level it with the straight edge of a knife.
- ★ Sieve the flour.
- ★ Add a teaspoonful of salt.
- ★ Scrape the coconut. Measure out 1/8 seer.
- ★ Powder the jaggery.
- ★ Roast the groundnuts and dice it.
- ★ Mix the scraped coconut, powdered jaggery and diced groundnut and keep aside.
- ★ Measure out 1/2 seer and two glassfuls of water.
- ★ Boil the water.
- ★ Add the boiling water to the flour, little by little, stirring the mixture all the while to avoid lumps being formed.

Spreading the coconut mixture on the flattened dough



Folding the plantain leaf over it

★ Allow it to cool.

★ The dough is now ready.

★ Make into small balls and cover.

★ Take a plantain leaf or *bhadam* or yam leaf, about 9 inches by 7 inches, and wet it.

★ Place a ball of the prepared dough on the leaf.

★ Flatten the ball of dough wtih the three fingers of the right hand.

★ Spread a tablespoonful of the coconut mixture evenly on the flattened dough.

★ Wet the edge of the flattened dough with a few drops of water and fold the plantain leaf over.

★ Place these cakes with the plantain leaf in a vessel for steaming.

★ Steam the *ragi* cake for 5 minutes.

★ Remove from the fire. The cake is cooked when steamed and therefore the dough no longer sticks to the plantain leaf.

★ Remove the cake off the plantain leaf. The coconut-jaggery mixture mixes well with the *ragi* while steaming.

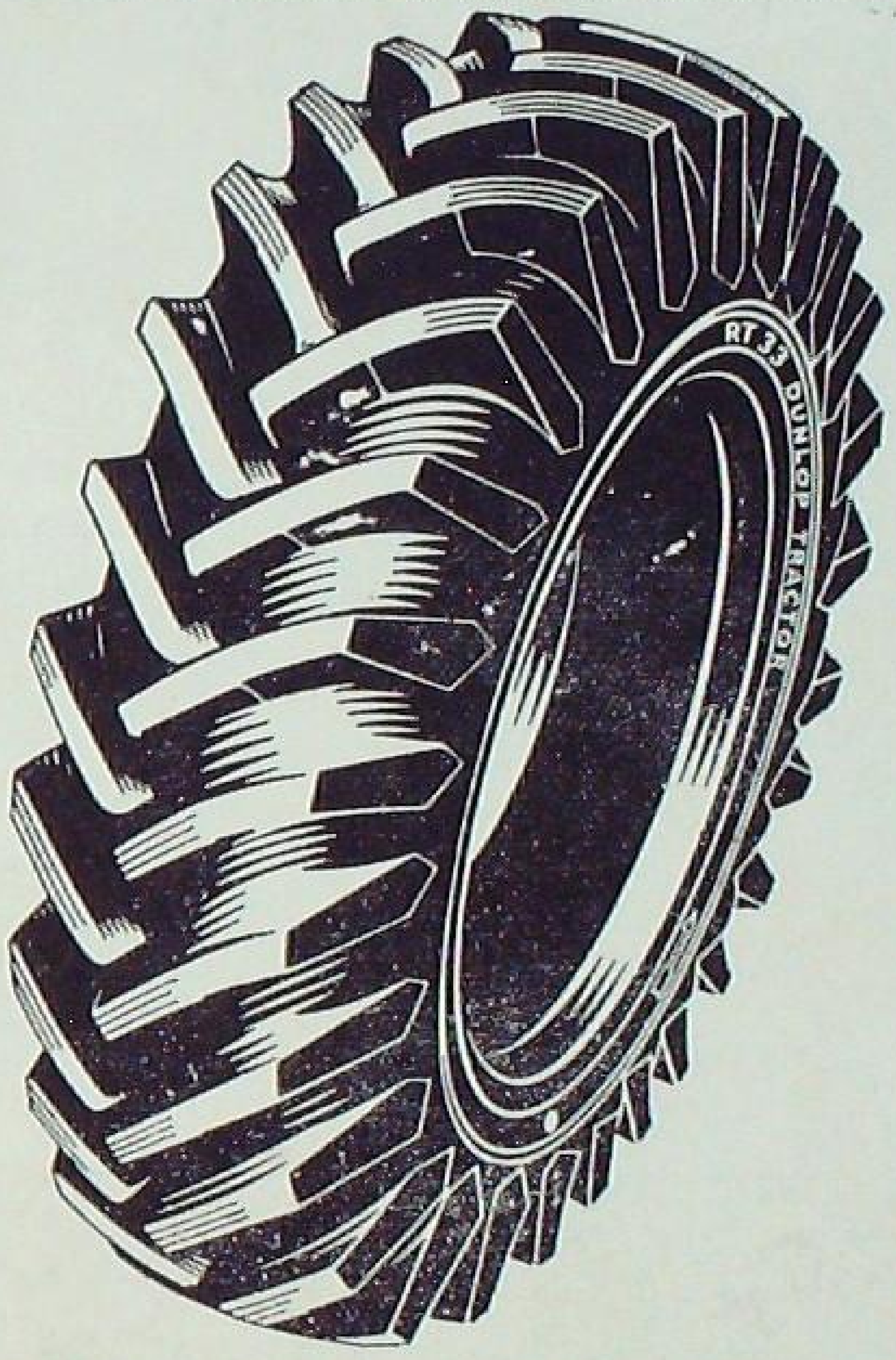
Now you have the cake. Eat it hot. You will like it.

(The author gratefully acknowledges the help rendered by Kumari P. Lalitha Kumari, Assistant Instructress, Home Science Wing, Bhavanisagar, Madras, in arranging the demonstration on how to make a ragi *cake.*

Placing the cake for steaming

Removing the cake off the plantain leaf

This tyre lowers your farming costs



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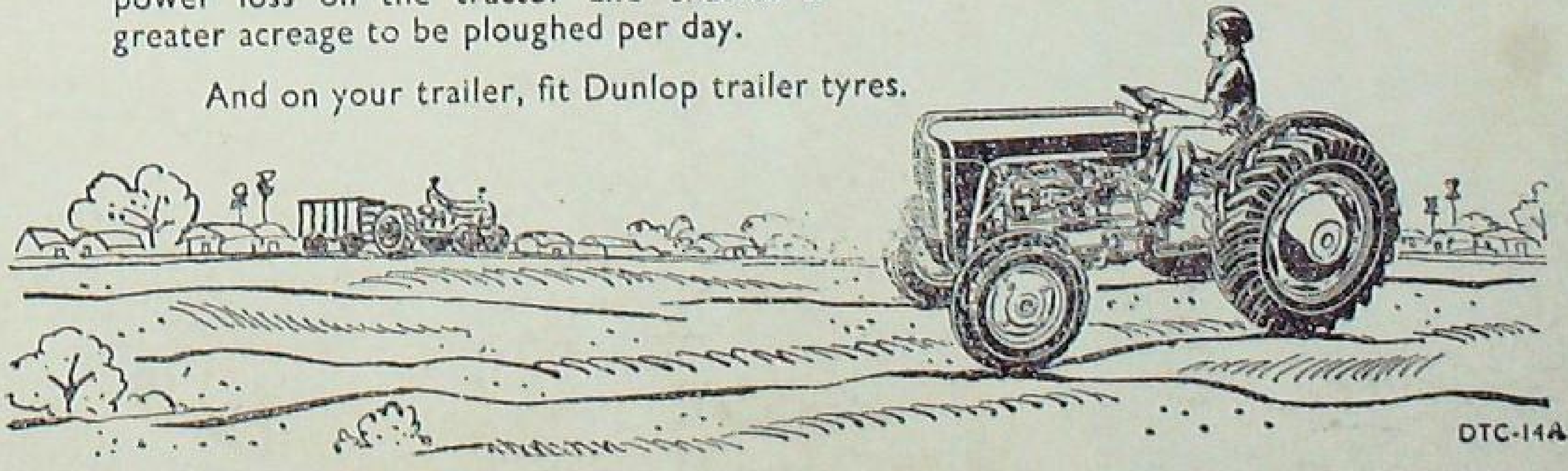

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